

Mount Diablo Astronomical Society

Diablo Moon Watch

May 2013

GENERAL MEETING

Tuesday May 28, 2013

The First 700 Seconds of the Saturn V Launch.

By Faride Khalaf

**Doors open at 6:45 p.m.
Lindsay Wildlife Museum
1931 First Avenue,
Walnut Creek, CA 94597**

**Please park East of the
museum, follow the
instructions on the last page**



As we witnessed each launch of the Apollo program, we would forever remember the countdown, ignition sequence, images of the Saturn V rocket engines billowing out vast, fast and furious hot gas and then lift off.

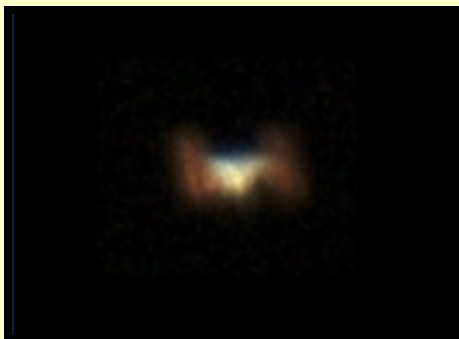
We'll never forget those sheets of ice breaking off the exterior and raining down on the launch pad as

the rocket cleared the tower. What we saw, what we remember and the extent of what was broadcast on the daily news is a very small fraction of what led to NASA's greatest achievements. Highlighting some of the interesting and little known technical aspects of the various missions, Faride Khalaf will take you down memory lane and

visit the Apollo program in a unique way. We will focus on some of the details starting from launch preparation to the last rocket blast that sent the gallant crew and their spacecraft on the way to the moon. In this presentation, you'll find answers to questions Walter Cronkite never thought to ask!

Come and join us and relive the oldest of human dreams, a dream worth revisiting.

Faride Khalaf started his career as a skydiver in 1982, received his FAA A&P licenses from College of Alameda. He's been a private pilot for over 25 years, a general mechanic and instructor at United Airlines for over a decade. Faride flies his own 1947 Cessna 120.



*Images of the International Space Station Taken with help of the students at:
El Dorado Middle School, Concord, California on April 24th 2013 at 9:08 p.m.
Camera and telescope provided by John Read.*

Fermi Space Telescope

By Steve Jacobs

WHAT'S UP

Steve will explain the design of the Fermi gamma ray telescope as well as the science Fermi is looking at, along with the results from 4-years of operation and of course a description of exactly what is a gamma ray.

PRESIDENT'S CORNER

Telescope Myths from the Men in White Coats

by Chris Ford

There are numerous amusing myths, false beliefs, and stereotypes in astronomy and about telescopes in particular, that continue to persist.

Astronomers wear White coats.

Watching an old 1950's science fiction film, I encountered again one of the most enduring and loveable

myths about astronomers reproduced in endless cartoons, movies, and comic books. Invariably there is the picture of an astronomer at the telescope wearing a lab coat, sitting in a chair inside the telescope dome, looking through an eyepiece of an unfeasibly long telescope, and making notes. However, this stereotype of astronomers is as we all mostly know completely wrong.



What the well dressed astronomer really wears



In fact more astronomers probably wear boots than they do lab coats

Well there is one exception.

Astronomers working in clean room environments might wear protective clothing, but otherwise most of them are in offices, often thousands of miles away from the observatory, and are wearing jeans and T-Shirts and drinking lots of coffee. Of course most professional astronomers do not look through giant refractors either!

Stars can be viewed in daylight from the bottom of a well, mine shaft, or a canyon.

This is a long-standing belief that goes back to Aristotle but it is not true. It is hard to see the stars in daylight because the glare of the atmosphere illuminated by the Sun completely swamps the light coming from the stars. A narrow field of vision looking up through a well might appear to decrease the brightness of the sky as you are only looking at a small part of the sky with a resulting increase in contrast. Thinking rationally about it however, if the atmosphere extends 50 miles or more above the Earth's surface viewing from the bottom of a hold less than 100 feet deep is not going to make much difference. In fact the view of the sky from the bottom of a well should appear even brighter because of the contrast with the dark walls of the shaft. Wells in general do not make good telescopes.

Pyrex telescope mirrors are superior to those made of ordinary glass.

This is not true either as it confuses the substrate material the mirror is made of with how fast it can cool down and remain thermally stable. One reason for this belief is probably because basic plate glass is less expensive and as a result is presumed inferior. However most of the expense in creating a telescope mirror comes from figuring that piece of glass into a working optic.



What every well dressed astronomer wears...

Telescope Myths from the Men in White Coats *(Continued from the previous page)*

Another more relevant reason is that unlike plate glass, Pyrex is a low-expansion material and less prone to deformation when it is at a different temperature than the air surrounding it. All things being equal however, in a thermally stable environment both mirrors should perform the same if figured to the same degree of accuracy. In theory, Pyrex should cool about 20 percent faster than plate glass but other factors such as the mirror's thickness and the design of its supporting cell are more important. Also, the main problem with mirror cooling is the layer of warm air in front of the primary mirror and no mirror regardless of what it is made of functions optimally until this "boundary layer" goes away.



Different mirror substrates from Mike Lockwood

Large telescopes are more adversely affected by seeing than small ones.

The idea behind this belief is that when visually observing there is little point in getting a large telescope unless the seeing conditions at your observing site are unusually good, especially in planetary astronomy. Some also claim that a small telescope can outperform a large one on nights

of mediocre seeing but there appears actually little hard evidence to support this assertion. No doubt, some small telescopes give better views than some larger ones, but this could just as easily be attributed to factors that have nothing to do with the atmosphere. In particular, the collimation and thermal characteristics that often impact larger telescopes that are almost always reflectors can come into play.

Fast focal ratio telescopes show brighter images.

Nope. This is a misconception carried over from photographic usage, where the fast f /ratios do indeed mean brighter images and shorter exposures for extended objects. However used visually, telescopes with equal apertures and equal magnifications have the same image brightness regardless of the focal ratio.

Ritchey-Chrétiens (RC) are the most perfect astrophotography telescope.

Increasingly less true as new telescope designs come onto market. RC telescopes do have some advantages where the number of optical elements must be kept at a minimum for sensitive photometry, astrometry, and other measurements, and only the minimal hyperbolic primary and secondary mirrors are in the light path. However for a photographic flat

field of any size, even a RC requires a field corrector adding one or more lens elements to the optical train. An uncorrected RC has some field curvature and suffers from astigmatism which elongates the star images at the edge of the photographic field. Therefore if you are going to have to add lens to the RC to achieve a photographic flat field you might as well explore other designs also. In fact today there are a number of superior designs to the RC for large flat field imaging especially with today's larger CCD sensors, that are both easier to make and collimate. The Corrected Dall Kirkham and Hymer-Wynn (Hyperion) designs are recent entrants in the market.

Galileo invented the telescope: Probably the most persistent telescope myth of all.

There are many others who claimed to have made this discovery including Zacharias Janssen spectacle-makers in Middelburg, and Jacob Metius of Alkmaar. The design of these early refracting telescopes consisted of a convex objective lens and a concave eyepiece. In fact, Galileo's telescope was not even the first to gaze into the heavens which was probably done by Thomas Harriot in England who drew Earth's moon in July 1609. Galileo of course is famous for what he discovered with his telescope such as the moons of Jupiter, and which pointed to an alternate model of the universe.

Telescope Myths from the Men in White Coats *(Continued from the previous page)*

Telescopes work better backwards:

How could anyone resist these pictures:

There are many more telescope myths. Clear skies!

Chris Ford

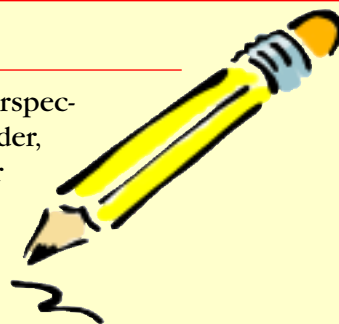


As Always Writers Are Wanted

We are always looking for new articles and content. If you have astronomical perspectives or experiences to share with your fellow members that you would us to consider, please feel free to contact me Chris (cford81@comcast.net) or our newsletter editor Vianney. (veloroute@hotmail.com)

Clear skies!

Chris and Vianney



After Chelyabinsk: European Expert Assess Asteroid Options

by the European Space agency

In February, a speeding asteroid slammed into our atmosphere and exploded high over Russia's Ural region, injuring hundreds and causing millions of euros of damage.

What should we do if we have a similar – or even bigger – strike in the future?

Of the more than 600 000 known asteroids in our Solar System, almost 10 000 are classified as near-Earth objects, or NEOs, because their orbits bring them relatively close to Earth's path.

Dramatic proof that any of these can strike Earth came on 15 February, when an unknown object thought to be 17–20 m in diameter arrived at 66 000 km/h and exploded high above Chelyabinsk, Russia, with 20–30 times the energy of the Hiroshima atomic bomb.

The resulting shock wave caused widespread damage and injuries, making it the largest known natural object to have entered the atmosphere since the 1908 Tunguska event, which destroyed a remote forest area of Siberia.



Asteroid trace over Chelyabinsk, Russia, on 15 February 2013

ESA watching out for Earth

“It’s important that we become aware of the current and future position of NEOs, develop estimates on the likelihood of impacts and assess the possible consequences,” says Detlef Koschny, Head of NEO activities in the Agency’s Space Situational Awareness (SSA) Programme Office.



Artist's impression of asteroids passing Earth

“More importantly, we must consider whether and how warning, mitigation and possible

deflection actions can be taken. It’s important not only for Europe, but for the rest of the planet, too.”

One aspect of ESA’s four-year-old SSA activity requires the development of an integrated system to scan the sky nightly for as-yet-undiscovered NEOs.

Another important element is studying how mitigation measures can be applied in the case of smaller NEOs, and how to deflect any larger ones that may seriously threaten our home planet.

International experts meeting in Spain

This week, Deimos Space, an industrial partner working for ESA on SSA, has invited top researchers from universities, research institutes, national space agencies and industry in Europe and the USA to discuss the state of the art in NEO

impact effects and threat mitigation.

“A great deal of work remains

After Chelyabinsk: European Expert Assess Asteroid Options (Continued from the previous page)

to be done, for example, in computer modelling of impact effects, how airbursts differ from ground strikes, kinetic versus explosive deflection strategies and much more," says Gerhard Drolshagen, of the SSA Programme Office.

"The aim is to develop plans that will guide us in current and future NEO research and development."

Ultimately, ESA aims to develop the capability to integrate Europe's current and new assets – such as automated telescopes – into a coordinated and more efficient NEO system that can provide nightly sky surveys and advanced warning.

"With this, we can work with our partner agencies, scientists, industry and international bodies like the UN to offer firm options

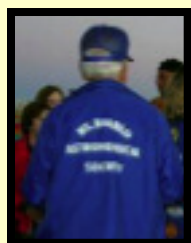
to national governments and political decision-makers," says Nicolas Bobrinsky, Head of ESA's SSA Programme.

"Events like the Chelyabinsk strike show that the NEO hazard is not just theoretical, and we need to invest in practical measures today to address tomorrow's threats."

Time to Order Your MDAS Jacket!

If you don't already own one, it's time to place an order for your very own official MDAS jacket!

Jackets are embroidered on the back with our club name, includes an MDAS patch sewn on the front, and your first name embroidered on the front. The cost of the jacket is \$55.00. Orders are only placed twice a year.



***The next order will be placed on June 14th, so reserve yours now!
Order online here:***

http://www.mdas.net/mdas_store.html#MDAS_Jacket

You may also reserve your personalized jacket by sending an email to berendsen@aol.com or call Marni Berendsen at 925-930-7431. Be sure to tell us the size you want (M, L, XL, XXL) and the first name you want embroidered on the jacket. You can bring a check for \$55 made payable M.D.A.S. to the next meeting or send the check to this address:

***Mount Diablo Astronomical Society
P.O. Box 4889
Walnut Creek, CA 94596***

Wear your MDAS colors proudly to all our events!

Mount Diablo Astronomical Society Event Calendar–May 2013

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
28	29	30	1	2	3	4 8:00 PM Observatory Maintenance 7:45 PM Muir Heritage Stargazing Sunset: 8:05 PM
5	6	7	10:00 AM Solar day at John Muir	8:00 PM YVHS Stargazing	10	7:30 PM Society Observing Sunset: 8:11 PM
12	7:30 PM Board Meeting	13	14	7:00 PM Bring a Mars Rover 6:30 PM Family Science Night at G	16	8:00 PM EPMS Stargazing
19	20	6:00 PM Telecon: High Energy	21	22	23	24
26	Memorial Day	27	7:15 PM Gen Mtg: The Saturn V	29	8:30 PM PHE Stargazing	30
					31	1

Yosemite Star Party July 5th and 6th, 2013



Board Members & Address

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MDAS

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Walnut Creek, CA 94596-3754

General Meetings:

Fourth Tuesday every month,
except on the third Tuesday in
November and December.

Refreshments and conversations at 6:45 pm;
Meeting begins at 7:15

Where:

Lindsay Wildlife Museum

1931 1st Avenue

Walnut Creek, CA 94597

(925) 935-1978

wildlife-museum.org.

Directions to facility:

From the North: Take 680 South to Treat Blvd.
exit. Turn left at light onto North Main St. Turn
right on Geary Road. Turn left on Buena Vista.

Turn right on First Avenue. The museum is
halfway up the block on the left.

From the South: Take 680 North. Take the Treat
Blvd./Geary Road exit and turn left over free-
way. Go three more lights and turn left on
Buena Vista. Turn right on First Avenue. The
museum is halfway up the block on the left.

Parking:

The museum is located in a residential area.
There are no parking fees nor meters. Please
park only in the museum parking lots on the
east side of the museum, the Friends Church lot
across the street (except Sunday mornings) or
on Buena Vista Avenue. Please do not park on
First Avenue in front of our neighbors' homes
— you will get a parking ticket.

